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THE CONCEPTION OF ENERGY CRISIS: A CROSS-SECTIONAL STUDY

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ABSTRACT

The purpose of this cross-sectional study is to examine how junior high school students and elementary students perceive crisis energy. An online survey, an open-ended inquiry, is used to distribute the instrument. There were 167 research participants, and the percentage included sixth-grade elementary students (14), seventh-grade students (51), eighth-grade students (6), and ninth-grade students (96). The study's findings indicated that ninth-grade students generated the most significant number of concepts, followed by eighth- and seventh-grade students. Students in the ninth grade proposed the idea that "environmental crisis" was the most crucial concept; among eight pupils, "energy limitation" seemed to be the most critical concept; and among high school students, "energy" was the most crucial concept. These findings suggest that more significant ideas about crisis energy can be brought up at higher educational levels. This is because through theoretical or hands-on activities. Ninth graders have gained a greater understanding of energy crisis ideas. The research implications allow educators to teach students more complex concepts connected to crisis energy in addition to the fundamentals.

Keywords: *crisis, energy, conception*

INTRODUCTION

Understanding the energy crisis is crucial since having the correct information will inspire genuine environmental care. Studies using cross-sectional data can explain the idea of the energy crisis at various stages of educational units. Since the concept of an energy crisis is studied in scientific classes, the school's viewpoint is the main focus of this study. The research participants who study the idea of energy and energy crisis in science courses refer to the fundamental skills taught in the classroom.

Previous studies have researched ideas about the concept of energy crisis. The fundamental understanding of the energy crisis has become the main reason for a country's development and progression. A multidisciplinary framework was created to bring students closer to the real-world setting, and scientific publications, analytical reports, and expert survey results were summarized to demonstrate that the energy transition is interdisciplinary. This process necessitates consideration of various factors and risks associated with a singular focus on specific energy sources or production methods.(Hakam et al., 2022). Globally, reducing greenhouse gas emissions and combating climate change have emerged as top priorities. (Mahbub et al., 2022).

The theoretical framework for the energy crisis is crucial across multiple sectors, including business, manufacturing, health, education, agriculture, and various service industries. Energy is essential for life, significantly influencing economic growth and serving as a catalyst for social advancement. Energy refers to the capacity to perform work or produce change. It exists in various forms, including kinetic, potential, thermal, and chemical energy, and is a fundamental concept in physics and engineering. Transformation and energy conservation are critical to understanding natural phenomena.(Xu et al., 2022). Energy has become an essential parameter used to regulate a country's economy.(Xiuhui & Raza, 2022). Those resulting from the decrease in gas supply are highly relevant and significant(Borowski, 2022).

This study was innovative because the research novelty examined a cross-sectional study of four groups interested in crisis energy. Prior research has identified distinct factors that stem from the viewpoints of educators and learners. Furthermore, earlier research has not recognized the concept of energy crisis in elementary and junior high school students, even though this student will go on to learn science and explain the idea of energy crisis. Additionally, this study shows how the concept of soil can be influenced by educational background and the quantity of learning resources. Thus, this study aims to characterize the kinds and amount of energy crisis concepts that sixth-grade elementary, seventh-grade, eighth-grade, and ninth-grade students possess.

METHODS

A cross-sectional study consequently does not incorporate a time dimension, as all data are collected simultaneously and primarily pertain to the period of data collection(Kesmodel, 2018). This is an observational study in which each participant's exposure and outcome are ascertained simultaneously. Compared to case-control or cohort studies, cross-sectional studies are the most straightforward individual-level observational study type and are typically easy to execute and reasonably priced(Pandis, 2014). Depending on whether the result variable is evaluated for any correlations with exposures or risk factors,

it can be categorized as either descriptive or analytical (X. Wang & Cheng, 2020).

Data preparation, implementation, and analysis are all part of the study process.(Rusyati et al., 2021). An open-ended inquiry concerning crisis energy was created during the planning phase. Research participants are receiving online surveys as part of the implementation stage. The first page of the online questionnaire requested participants to write down their identification and instructions to answer based on their knowledge, not from books or the internet, to ensure their honesty when answering the questions. The next step is data analysis, which involves turning open-ended data into concept codes composed of percentages for each of the three research participant groups. The study phases involved creating open-ended questions, submitting the application to transform it into an online survey, and then sending the link to the online survey to 167 research participants. The proportion included sixth-grade elementary, seventh-grade, eighth-grade, and ninth-grade students. There are three questions related to an energy crisis: (1) what do you know about the energy crisis? (2) How did you know about the energy crisis? (3) Why should we study the energy crisis?

Table 1 shows the percentage of Research subjects. There are 167 students involved, and the percentage comprises sixth-grade elementary students, seventh-grade students, eighth-grade students, and ninth-grade students. The students studied the energy crisis in a science lesson.

Table 1. The proportion of research subject

Status	***Total***	***Male***	***Female***
6^{th}	14	9	5
7^{th}	51	27	24
8^{th}	6	3	3
9^{th}	96	42	54
Total	167	81	86

RESULTS AND DISCUSSION

There are three questions related to the energy crisis: (1) what do you know about the energy crisis? (2) How did you know about the energy crisis? (3) Why should we study the energy crisis? The first question is, what do you know about the energy crisis? The results of the conception of energy crisis are presented in Fig. 1. Sixth-grade students show that "Crisis" and "Energy" appeared in more than 30% of 18 key concepts. Seventh-grade students show that the concepts of "Crisis" and "Source" appeared in more than 20% of 18 key concepts. Eighth-grade students show that "Energy limitation" concepts appeared in more than 40% of 4 key concepts. Ninth-grade students show that "Environmental crisis" and "Climate change" appeared in more than 20% of 24

key concepts. The concepts of "Crisis" and "Energy" appeared in more than 20 % of 18 key concepts from all levels of students.

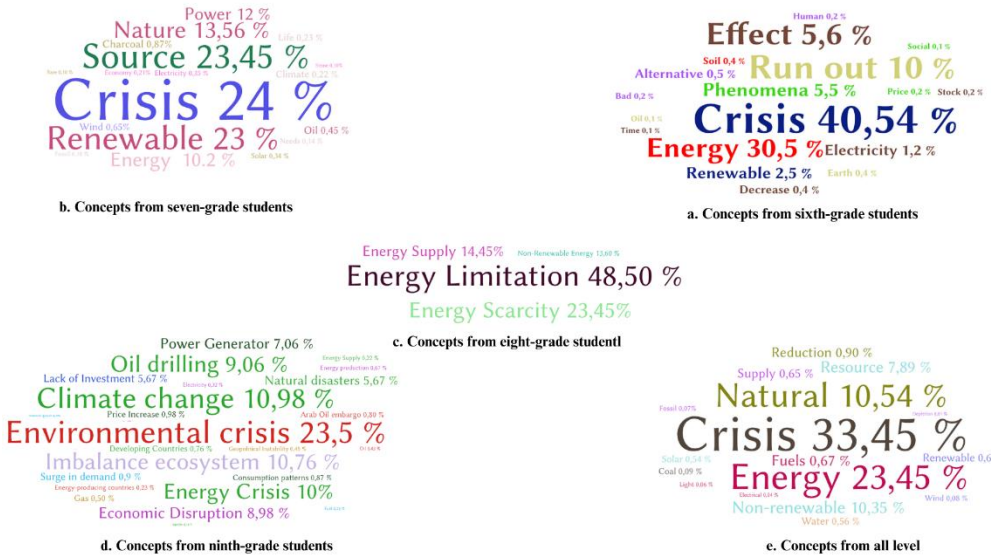

Figure 1. Conception of energy crisis based on the school's perspective

Research data shows that the concept of "Crisis" represents the "energy crisis" concept. Due to the global energy crisis, energy management has altered, with a greater focus on energy efficiency. (Gajdzik et al., 2024). One of the concepts that appears is renewable energy. To optimize the current energy mix while also protecting the environment, renewable energy is a crucial part of the energy supply(Q. Wang et al., 2022). It has become imperative to develop renewable energy sources like solar, biomass, wind, and hydro to replace traditional energy sources due to the rise in fossil fuel usage and the resulting environmental degradation.(Li et al., 2022).

The second question is, how did you know about the energy crisis? Results of the sources of energy crisis conception are presented in Fig. 2. Sixth-grade students show the sources of energy crisis conception from "School" appeared in more than 50% of 5 key concepts. Seventh-grade students show the sources of energy crisis conception from "Internet" and "News" appeared in more than 30% of 9 key concepts. Eight-grade students show that sources of energy crisis conception from "Social media" appeared in more than 30% of 4 key concepts. Ninth-grade students show sources of energy crisis conception from "Social media" appeared in more than 30% of 9 key concepts. The concepts of "Google" and "Science Lesson" appeared in more than 40 % of 9 key concepts from all levels of students when finding the sources of energy crisis conception.

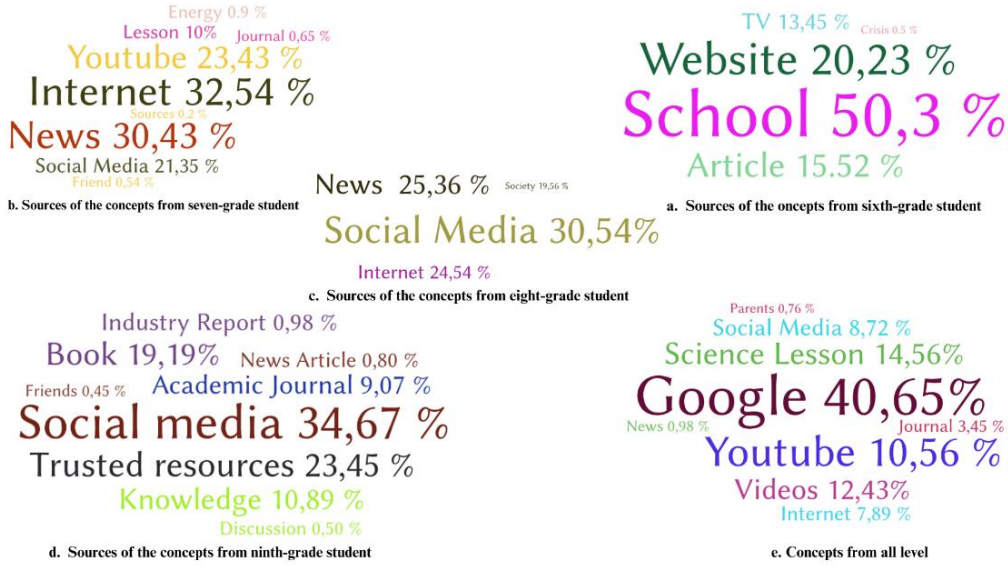

Figure 2. Sources of the conception of energy crisis based on the school's perspective

Research data shows that the most significant source of concepts of "Google" represents the concept of "energy crisis" from students' conception. The Google search engine is used by billions of people daily and has become associated with searching. (Strzelecki & Miklosik, 2024). Another significant source is "social media". Since the early bloggers of the late 1990s, social media influencers have used sites like YouTube and Instagram to broaden their audience and vary the content they post (Han & Balabanis, 2024). Social media influencers are people who have amassed a sizable following on social media and have the power to shape the opinions and actions of their audience (Han & Balabanis, 2024). Using a social media simulation, the current study created an experimental poll that mimicked a social media network. (Prike et al., 2024). Social media has been a valuable and easiest way to get to know and engage with the user. One of the crucial issues is the global energy crisis.

The third question is, why should we study the energy crisis? Results of the reason for studying energy crisis conception in Fig. 3. Sixth-grade students show that "alternative energy" appeared in more than 20% of 13 key concepts. Seventh-grade students show the reason for studying energy crisis conception is that "energy crisis" appeared in more than 40% of 8 key concepts. Eight-grade students show that the reason for studying the energy crisis conception is that "energy crisis" appeared in more than 30% of 4 key concepts. Ninth-grade students show that the reason for studying energy crisis conception is that "energy crisis" appeared in more than 40% of the 16 key concepts. The reason for studying energy crisis conception is that "energy crisis" appeared in more

than 35 % of 9 key concepts from all levels of students when finding the sources Of energy crisis conception.

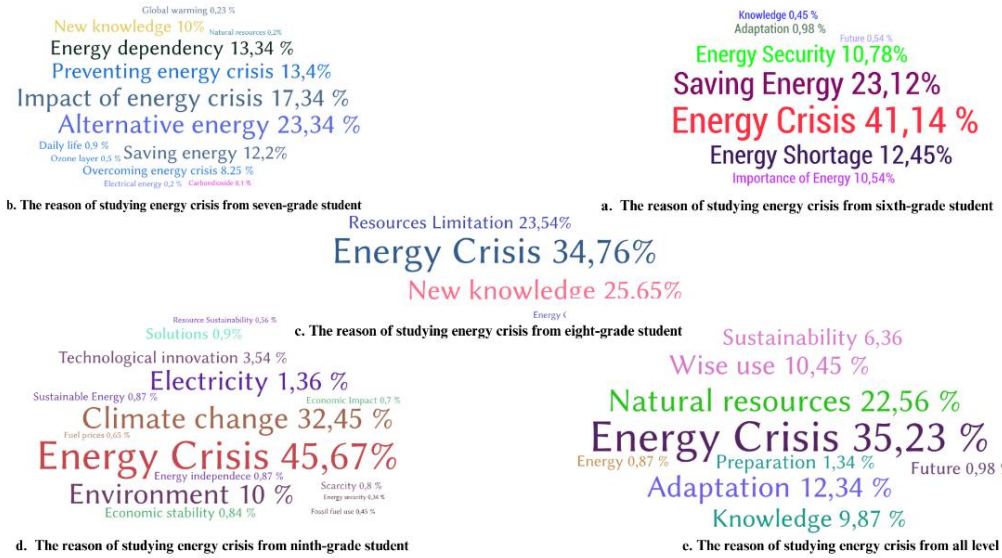

Figure 3. The reason for studying energy crisis is based on the school's perspective

The energy sector often faces three challenges: energy poverty, households that lack access to energy, energy security, and climate change. (Huang et al., 2022). Household power prices have reached all-time highs due to the energy shift, the ongoing global energy crisis, and inflation. (Einolander et al., 2024)Significant hikes in electricity prices made 2022 particularly difficult for consumers. When faced with extremely high electricity rates, households can only lower their utility bills by reducing usage, investing in self-generation, switching to a time-based electricity contract, and shifting consumption to less expensive hours.

Based on the data, ninth-grade students have the highest conception of the energy crisis. Students' personal characteristics, motivations, and prior experiences play a significant role in shaping their understanding(Wasim et al., 2024). Socioeconomic and cultural background also play an essential role. Various factors, including cultural attitudes toward science, scientific perceptions, and economic conditions, influence students' opinions about the feasibility and desirability of the energy crisis.

CONCLUSION

In this cross-sectional study, the idea of an energy crisis owned by sixth-grade elementary students (14), seventh-grade students (51), eighth-grade students (6), and ninth-grade students (96) is to be examined. An online survey, an open-ended inquiry, is used to distribute the instrument. Ninth-grade students proposed the idea that "environmental crisis" and "climate change" were the highest notion; in eighth-grade students, the idea of "energy limitation" seemed to be the highest, and in seventh and sixth-grade students, the idea of "crisis" was the highest. These findings suggest that

more significant ideas regarding conceptualizing energy crises can be brought up at higher educational levels. The implications of the findings give educators the chance to teach students more complex concepts connected to the energy crisis and the fundamentals.

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